

HENRY M. SHREVE—SNAG BOAT.

[To accompany bill H. R. No. 348.]

FEBRUARY 28, 1843.

Referred to the Committee of the Whole on the state of the Union.

CONGRESS OF THE UNITED STATES.

IN THE HOUSE OF REPRESENTATIVES OF THE UNITED STATES,

February 11, 1843.

On Motion of Mr. Triplett,

Ordered, That the Committee of the Whole House to which is committed the bill No. 348, for the relief of Henry M. Shreve, and to authorize the purchase of his patent for a snag boat, be discharged, and that the said bill be recommitted to the Select Committee by whom the same was reported, of which Mr. Cross was chairman.

Mr. Cross, Mr. Gentry, Mr. Sprigg, Mr. Miller, and Mr. Gwin, were appointed the said committee.

Attest :

M. S. CLARKE, *Clerk*.

Mr. Cross, from the Select Committee to which the subject had been referred, submitted the following

REPORT :

The Select Committee to which was recommitted bill No. 348, for the relief of Henry M. Shreve, and to authorize the purchase of his patent for a snag boat, ask leave to report :

That, with a view to meet fully the object of the recommitment, they have carefully examined the memorial and evidence upon which the said bill is founded, and can perceive no reason to doubt the correctness of the report heretofore made, in any of its material statements or views. The subject, however, to which the committee directed its attention more particularly was an inquiry as to the claim of the memorialist to originality as inventor of the plan upon which the snag boat has been constructed, regarding this as the principal object of the recommitment. In prosecuting the inquiry, copies of the letters patent, with specifications of the plan of construction, and such other plans as could be ascertained, believed to be analogous in design, were procured, and submitted to the Commissioner of Patents and the chief of the bureau of Topographical Engineers, with a request to each, that he would cause the same to be compared, and the difference, if any, carefully pointed out and explained. From the respective answers of these officers to the call thus made, (which answers are hereto appended and made part of this report,) it appears that, so far as other ascertained or

known plans are concerned, the claim of the memorialist to originality as inventor of the snag boat is clear and well founded. Of the utility, and, indeed, indispensable necessity for the use of the snag boat in improving the navigation of rivers, it is deemed unnecessary to add any thing to what has been said in a former report. Early and definitive action on the bill is believed to be essential to the interest of the Government, on the ground that it cannot reasonably be expected that the memorialist, with an unquestioned claim to originality of invention, combined with the legal right "of making, constructing, using and vending to others to be used, the said improvement," will submit to its use by the Government or private individuals, without an effort to maintain the rights secured to him by the terms of his patent. In resisting an invasion of his patent, awarded more than four years since, there would seem to be no just cause of complaint on the part of the Government or individuals, as he has been urging, and still urges, its purchase upon Congress. By the terms of the patent, it will be perceived that his exclusive right to construct, use, and vend, has still nearly ten years to run. If, therefore, the claim to indemnity for the use of boats constructed on his plan and under his superintendence, when in the employ of the Government, be considered doubtful, it will be otherwise as to those of subsequent construction, or that may be hereafter required. Under a conviction that both policy and justice require the purchase, the committee beg leave to submit the bill as heretofore reported, with a recommendation that it be speedily acted upon.

HOUSE OF REPRESENTATIVES, February 18, 1843.

SIR: I am instructed by the Select Committee on the memorial of Captain Henry M. Shreve to submit the accompanying patent and specifications of a plan for a snag boat to your bureau, with a request that you will cause the same to be carefully examined, and the substantial difference, if any, pointed out and explained, between said plan and any others for the same purpose on file in your office, or of which you have any knowledge, but more especially those proposed prior to the year 1828, and those communicated to the War Department by D. Prentice and John Bruce, the first on the 10th July, 1824, and the latter in September of the same year.

Your early attention to this subject is respectfully asked, and a return with your answer of the accompanying papers requested.

I am, sir, very truly, your obedient servant,

EDWARD CROSS,
Chairman Select Committee.

Col. J. J. ABERT,
Topographical Engineers.

[NOTE.—Similar letter addressed to the Commissioner of Patents, enclosing a copy of D. Prentice's letter, and drawings of a plan for a snag boat proposed by John Bruce.]

BUREAU OF TOPOGRAPHICAL ENGINEERS,

Washington, February 24, 1843.

SIR: In order to procure an early answer to your letter of the 18th, I directed Captain Hughes, a very competent officer, to make the investigation you desired, and I have now the honor to enclose the result of his examination. From this it will appear that the merit of the invention for which Captain Shreve has obtained a patent is justly due to him.

Very respectfully, sir, your obedient servant,

J. J. ABERT,

Col. Corps Top. Engineers.

Hon. EDWARD CROSS,

Chairman Select Committee, Ho. of Reps.

TOPOGRAPHICAL BUREAU, *February 23, 1843.*

SIR: The letter from the Hon. Edward Cross, "chairman of the select committee on the memorial of Captain Henry M. Shreve," having been referred to me, I have carefully examined the subject to which it relates, and have the honor to submit the following results:

Mr. Cross requests that a comparison may be instituted between the patent and specifications for a steam snag boat alleged to have been invented by Henry M. Shreve, and any other plans, for the same object, which may be on file in the Topographical bureau—more especially those communicated to the War Department by D. Prentice and John Bruce, in the year 1824.

Mr. Prentice's letter, descriptive of his plan, is dated the 10th of July, 1824. It is not accompanied with drawings, and its details, therefore, are not readily or fully understood. He contemplated the employment of twin hull boats, similar to those frequently used for ferry boats, strongly combined together, but by an arrangement of braces, different and less effective than those subsequently adopted by Captain Shreve. He proposed a windlass, supported on a gallows frame, somewhat resembling Shreve's, but differing from his by having a large drum attached to one end of the windlass, instead of a wheel at each end—the latter being a better arrangement. The manner, too, of fastening to the snag is essentially different in the two plans. In Prentice's boat, the chain would revolve on the drum. In Shreve's, it works on the windlass or shaft. Mr. Prentice recommends, that, when the chain has been made fast to the snag, (which is supposed to have been brought between the twin hulls,) "after heaving on it, to run the boat up and down or across, so as to shake and loosen it. If once it yielded, the constant shaking and heaving would bring it out."

He does not appear to have contemplated using the momentum of the boat under the continued action of the steam engine, or of resorting to its impact on the snag, by means of what is called the "*snag beam*" in Shreve's patent; yet the one may naturally have suggested the other.

From the want of the necessary drawings, it is impossible to say what other difference, than those already pointed out, may exist between the two plans.

Mr. Bruce's letters are dated in September, 1824. As far as an opinion

may be formed from his very imperfect specifications and drawings, his plan seems to differ materially from that patented by Captain Shreve, and to have indeed but little in common with it, excepting the twin hulls, the application of steam, and some of the common mechanical power in general use—none of which are claimed by Captain Shreve. He proposed to place the paddle wheels between the two hulls, which would have seriously interfered with the machinery of the boat.

Prentice and Bruce both recommended plans, in 1824, for the extraction of logs, &c., from the beds of rivers, by the application of steam power. Captain Shreve did not concur at that time in the opinion of the practicability of effecting this desirable object. He says: "To drag all the trees from the bed of the river is not practicable," but he proposed "to saw them off six or eight feet below the surface of the water at its lowest stage." How far the crude and imperfect plans of Bruce and Prentice may have suggested to him, subsequently, the practicability of extracting the largest snags, bodily, from the bed of the river, is not apparent. The conclusion at which I have arrived, after a minute examination of the case, is, that the patent to Captain Shreve, for the improvements claimed by him, was issued for good and sufficient reasons, and that he was the inventor or constructor of these improvements.

Very respectfully, your obedient servant,

GEO. W. HUGHES.

Col. J. J. ABERT,

Chief Topographical Engineer.

PATENT OFFICE, *February 21, 1843.*

SIR: In reply to yours of the 18th, requesting an examination of the plans of Mr. Prentice and Mr. Shreve, I have the honor to transmit the opinion of the examiner of this office, who has detailed the peculiar properties and advantages of each invention, and I will only add his examination has been very particular.

Respectfully,

H. L. ELLSWORTH.

N. B. I return the papers.

H. L. E.

Hon. EDWARD CROSS, *Ho. of Reps.*

PATENT OFFICE, *February 21, 1843.*

SIR: In conformity with your instructions, I have examined the descriptions of the methods of removing snags and sawyers, as proposed by Mr. Daniel Prentice and Mr. John Bruce, in their communications to the Secretary of War, in the year 1824, and compared them with the plan proposed and patented by Captain Henry M. Shreve, on the 12th of September, 1838, and have the honor to submit the following report:

The only resemblance between Mr. D. Prentice's plan and Captain Shreve's is in the employment of a twin boat and windlass, so combined together as to act upon the snag, to raise it from its bed, when situated

between the two boats, the space between them being sufficient for this purpose. This is the whole of the plan proposed by Mr. Prentice ; a plan which, at the time it was proposed, was known, and had been used in different parts of the world for the purpose of raising rocks and other obstructions from the bottom of rivers. With the twin boat and windlass, Captain Shreve has combined various contrivances, by which he is enabled to concentrate on a snag the power of the windlass, the momentum of the whole mass of the boat, and the power of the engines communicated through the paddle wheels. It is this combination (together with another point which will be hereafter mentioned) which presents the great features of novelty and usefulness that distinguish Captain Shreve's plan from all others before known.

The method proposed by Mr. Thomas W. Bakewell, as described in Mr. Prentice's communication, is similar to Captain Shreve's plan only in the proposed employment of the momentum of the boat with the power of the engines, applied through the paddle wheels ; but the arrangement of mechanical means to accomplish this end is entirely different. Mr. Bakewell proposed to employ a common steamboat, to attach a cable to the snag, pay out (as it is termed) two or three hundred yards of cable, start the boat, and, when it had run a distance equal to the length of the cable payed out, the momentum of the boat and the power of the engine were brought to bear on the snag to uproot it. In this plan the power is applied to the snag, through an elastic medium, (the cable,) which will greatly reduce the momentum of the boat before the snag can be seriously affected ; whereas these accumulated forces are brought to bear, by Captain Shreve, at once, by a solid body—viz, the beam which unites the two boats together at the bow. There is not only a difference in the mechanical arrangements of these two plans, but one is necessarily superior to the other.

As to the plan proposed by Mr. John Bruce, it has no other resemblance to Captain Shreve's plan than the employment of a twin boat, which, as I have stated before, was not new at the time it was proposed by Mr. Bruce, and therefore can have no bearing on the validity of Captain Shreve's patent, which could in no way be affected by any of these plans, were the subject submitted to legal investigation.

All which is respectfully submitted.

CHARLES M. KELLER,
Examiner of Patents.

HON. HENRY L. ELLSWORTH,
Commissioner of Patents.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, February 17, 1843.

SIR : In answer to your letter of yesterday, I have the honor to state that there are no drawings in the office referring to the plan of Mr. Prentice. There were drawings with the plan of a Mr. Bruce, which are herewith enclosed, together with his letters on the subject.

Very respectfully, sir, your obedient, servant,

J. J. ABERT,
Col. Corps Top. Engineers.

HON. EDWARD CROSS,
Chairman, &c., Ho. of Reps.

BUREAU OF TOPOGRAPHICAL ENGINEERS,

Washington, February 8, 1843.

SIR: In conformity with your directions, I have the honor to submit the enclosed copy of a letter, dated July 10, 1824, from Mr. David Prentice, describing his plans "for clearing the Mississippi of snags and sawyers," called for by a letter of the 3d instant, from the honorable Mr. Cross and the honorable Mr. Triplett.

Very respectfully, sir, your obedient servant,

J. J. ABERT,

Col. Corps Top. Engineers.

HON. JOHN C. SPENCER,

Secretary of War.

LOUISVILLE, *July 10, 1824.*

SIR: In consequence of an advertisement published in the newspapers, I send you two plans for clearing the Mississippi of snags and sawyers. It may not be improper to state that I am a millwright, engineer, and steamboat owner; and that for two years I ran a steamboat on the Mississippi.

The plans I offer may be considered as too expensive, but I am satisfied no lesser means will answer the purpose. Any attempt made to saw off or cut the tree will be either abortive or dangerous. It is impossible, in the rapid current of the Mississippi, to use any saw or tool, under water, at any considerable depth; and to cut snags at less than seven feet under the surface will only render them more dangerous, and which all steamboat owners will deprecate. There seems to me no way but to pull them up bodily, and deposite them where they will be harmless. To effect this requires powerful means, and such I shall endeavor to describe.

The first plan consists in building or procuring a double or twin steamboat, somewhat similar to the ferry boats in use on the Delaware or North rivers, but stronger and more distant from each other.

The water wheels must be at the *outsides* of the boats, so as to leave the space between them entirely clear, as it is in that space the work is to be done. On this account, also, the connecting beams of the boats must be high out of the water, perhaps fifteen or twenty feet. Between the boats, and well supported on strong frames at each end, a strong windlass is to extend. This is intended to act on the snag, and must be of a strength equal to supporting forty or fifty tons. It must be furnished with a chain, and proper rings, hooks, &c., for grasping the snag. Motion may be given to it from the engine in various ways; but I would recommend the following method, as being strong and easily repaired, which is an object of great consequence in the place where the service is wanted.

On the end of the main windlass let there be a large plain wheel fixed, say twenty or twenty-five feet diameter; the outside of this wheel to be so broad as to allow some six or eight turns of hawser to be coiled, of which one end would be made fast, as on the barrel of a common crane. The other end of the hawser to lead to a lesser windlass in the same boat, which is to be capable of attachment to the engine at pleasure. The main windlass must be pretty high above water, to allow of a long pull at once.

The boat and machinery being procured, the manner of using would be easy.

It is to be noted that all or nearly all the snags lie in a slanting direction, with the tops of the trees down stream, and the roots fast at the bottom. With this kind, the operation would commence by running the boat so as to bring the snag or sawyer between the boats. The main chain is then to be attached to the snag, the wheels thrown out of gear, and the small windlass into it, when in all probability the snag would give way, and be drawn out from the ground. If it did, the boat might be directed to deep water, and then drop it, where it would be harmless, or the root might be cut away, which would sink, while the top would float. From sawyers, little resistance would be found. It might be found sufficient with them and very slanting snags to raise the tops considerably out of the water and cut them off at its edge. On this being done, the top would float away, and the root part would settle below the water, so as to be out of the way. With large, upright, deeply-fixed snags, the trouble would be greater; with them I would, after heaving on them, run the boat up and down, or across, so as to shake and loosen them; if once it yielded in the least, the continued shaking and heaving would bring it out.

It is scarcely necessary to enter more into detail on the best way of using this implement. A man of common good sense would very soon discover how to make the most of it. I am satisfied in having recommended a plan by which approach to the snags is made safe and easy, and their extraction certain. The expense of boat and machinery would be about six or seven or eight thousand dollars, according to the size and goodness. This may be considered as a great outlay on an untried plan, but I have no doubt that it would prove cheapest in the end.

The other plan is recommended by Mr. Thomas W. Bakewell, a considerable steamboat owner, and formerly my partner. It consists in this: To buy an old steamboat, which may be done for three or four thousand dollars, or to hire a sound one for the season of low water, which could be done for the same money; the larger and heavier the better, with a stern wheel if possible. The method of using is as follows: Run up to the snag, make fast to it a very strong cable, pay out about one or two hundred yards of the cable, and put the boat under full headway right across the stream. On the cable being brought to a stretch, the whole momentum of the heavy boat would be brought to bear on the snag with a force nothing could resist. The snag must be either wholly or partly torn up or broken at the bottom, or the cable must part. If the snag is partly torn up, a repetition of the pull will bring it entirely. When loosened, it may be disposed of as before recommended.

These are the plans recommended by practical men, well acquainted with mechanics and with the obstructions of the river. If any personal reference is necessary to give weight to my opinion on this subject, I would name Samuel Richards and Frederick Graff, of Philadelphia, as men who know me well, and whose knowledge of these matters make their opinion of value.

I am, sir, very respectfully, your obedient servant,
DAVID PRENTICE.

To the SECRETARY OF WAR, *Washington.*

THE UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, greeting:

This is to certify, that the annexed is a true copy of letters patent (without the drawings) granted to Henry M. Shreve, for an improved machine for removing snags and sawyers from the beds of rivers, dated the 12th day of September, 1838.

In testimony whereof, I, Henry L. Ellsworth, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed, this [L. s.] sixteenth day of February, in the year of our Lord one thousand eight hundred and forty-three, and of the independence of the United States the sixty-seventh.

HENRY L. ELLSWORTH.

No. 913.

THE UNITED STATES OF AMERICA.

To all to whom these letters patent shall come:

Whereas Henry M. Shreve, of St. Louis, Missouri, has alleged that he has invented a new and improved machine for removing snags and sawyers from the beds of rivers, which he states has not been known or used before his application; has made oath that he is a citizen of the United States; that he does verily believe that he is the original and first inventor or discoverer of the said improvement; and that the same hath not, to the best of his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose:

These are therefore to grant, according to law, to the said Henry M. Shreve, his heirs, administrators, or assigns, for the term of fourteen years from the twelfth day of September, one thousand eight hundred and thirty-eight, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said Henry M. Shreve, in the schedule hereunto annexed, and is made part of these presents.

In testimony whereof, I have caused these letters to be made patent, and the seal of the Patent Office has been hereunto affixed.

Given under my hand, at the city of Washington, this twelfth day of September, in the year of our Lord one thousand eight hundred [L. s.] and thirty-eight, and of the independence of the United States of America the sixty-third.

JOHN FORSYTH,
Secretary of State.

Countersigned and sealed with the seal of the Patent Office.

HENRY L. ELLSWORTH,
Commissioner of Patents.

Henry M. Shreve, of St. Louis, Missouri.

LETTERS PATENT—No. 913.

[The schedule referred to in these letters patent, and making part of the same.]

Be it known that I, Henry M. Shreve, of the city and county of St. Louis, and State of Missouri, have invented a new and useful machine for removing trees, roots, logs, &c., (called snags and sawyers,) from the beds and channels of rivers, which may be called the *Archimedes* or *steam snag-boat*, described as follows, reference being had to the annexed drawing of the same, making part of this specification.

It is no doubt well known that great difficulties have existed in the navigation of the Mississippi river, and other rivers of the West, arising from numerous snags, sawyers, and other impediments, found in the tracks of steam and flat boats throughout the whole length of the former river; and so numerous were these obstructions that no pilot could bear in mind their location.

To perform a great public good in removing these obstructions from our rivers, the subscriber has invented and constructed a very simple machine, that will accomplish this most desirable object with the greatest despatch and at the least expense, and has at length succeeded beyond the most sanguine expectation. The machine is beautifully simple, and most powerful in the operation, and produces the effect intended in the most admirable manner. It consists of a double or twin boat, (A, figures 1, 2, 3,) connected by two tiers of beams: the upper tier running from the midships or centres of the boats to the stern of the same, decked over on the tops of the upper beams; the lower tier running from midships towards the stern, about half the distance of the upper tier, and sealed, sheathed, or planked, under said lower tier of beams, and secured by diagonal timbers, (t, figure 4,) running on the top of the lower tier of beams, framed on to each beam, and secured by a bolt passing through the beam. The front or forward end of the two sets of beams are connected by a strong bulkhead, (C, figure 1,) fixed in an inclined position, and sheathed with sheet iron, about one-fourth of an inch thick, the lower side of the bulkhead being thirty inches forward of the upper side, forming an inclined plane, by which the end of a snag is conducted on deck by the impetus of the boat, when the snag comes in contact with said bulkhead.

There is also a large beam, (D, figures 1, 2, and 6,) passed through the sides of the two hulls, near their bows, running quite through the hulls of the boat to their outside frames. This beam is made of square timber, fitted and bolted together to form a mass of timber nine feet fore and aft, and two and a half feet thick, rounded on the front side to a semicircle, or nearly so, and sheathed with sheet iron, about one-fourth of an inch thick. There is a fore and aft framing of timber, (E, figures 1, 2, and 7,) running from the middle of the boats to the stern, raised seven feet above the deck, and supported by perpendicular stanchions (u, figure 7) and diagonal braces, which also support cradle pieces. (y,) to conduct the snags down on to rollers, (F,) as they are drawn on deck, the rollers being placed in a line, near the deck, from the forward end of the middle deck to the stern.

The main windlass (G, 1, 2, 3, and 5) of the machine is placed about two feet forward of the bulkhead (C) at the middle of the boats, resting on

a diagonal framing, (H, figures 1, 2, and 3,) called *gallows frames*, 20 feet above the water, more or less, as may be found convenient. The main windlass consists of a cast iron shaft, (G,) sixteen inches diameter in the centre, and ten inches at the ends and journals. On each end of the windlass there is a wheel (T, figures 1, 2, 3, and 5) eighteen feet diameter, with a score, groove, or recess, on the periphery of the rim, of six inches wide and four deep, in and round which a five and a half inch line (J, figures 1, 3, and 5) is passed, and leads down through blocks and sheaves to the windlasses (L L, figure 1) on the coupling shaft (M) of the engine; which windlasses are four feet long and sixteen inches diameter. By these lines thus working on the windlasses, a perpetual and prodigious lever power is obtained. From the main windlass (G) there is a chain (N) suspended, made of malleable iron, two inches thick, with links as short as they can be made, and at the same time allow them to work clear of each other. One end of this chain (which is sixty-five feet long, or of any other suitable length or size) is fastened on the windlass, (G,) and winds round the same to any extent required; the other end of the chain hangs in a loop, (O, figures 1, 3, and 5) or running noose, down to the surface of the water, or below it if required. In that end of the chain there is a shackle or large ring, (P, figures 3 and 5,) made of iron, three inches diameter, or so large as to let the chain reave through it freely, by which the running noose on the chain is made. To the shackle there is attached a tackle, (Q,) which leads to a cross beam (R) of the gallows frame above, by which the running noose in the end of the chain is controlled. A leading block and sheave is attached to the shackle, through which a line (S) is passed, one end of which is fastened to the bows of the larboard boat, (A,) the other end passes through a leading block (T) on the bows of the starboard boat, (A,) and leads aft to the windlass (U) on the main shaft of the engine; by that line the chain is drawn out and passed down on the snag to any distance required. There is also a line (V) passing around chocks (W) on the arms of the larboard purchase wheel, and leading down to the windlass (U) on the larboard main shaft of the engine. The use of this line is to reverse the motion of the purchase wheels, for the purpose of lowering the chain down to renew the purchase on the snag at pleasure.

The whole of the machine is worked by the power of a double steam engine, (X X,) coupled by the permanent shaft, (M,) extending from the crank (Y) of one engine to the crank of the other.

The operation of the machine is as follows: When snags or trees are found so firmly fixed in the bottom or bed of the river as to be liable to break before the roots give way, they are removed by running against them with the twin boat, so as to strike the snag with the large beam (D) in front, which, in nearly every case, breaks the snag off below the bottom of the river as far as the diameter of the tree. Where the snag is not so firmly fixed as to break, the beam runs under it, and turns it over in a position contrary to that in which it was first found, as so far to allow the boat to pass entirely over it, by which means the tree is so loosened from the mud or sand in which it is imbedded as to be taken up by the main windlass (G) in the manner before described, and laid horizontally on the rollers (F) on the after deck, where the root is cut off with a cross-cut or other saw by hand or the steam power, and the root deposited in the bends of the river, where the water is from fifteen to twenty feet deeper than it is over the bar. Consequently the root sinks many feet below the draught

of water that any boat can carry over the bar. The trunk of the tree is cut into several lengths, of from twenty to thirty feet, and thrown overboard, where they are carried down by the stream, and are caught for firewood, or pass off to the sea. The entire operation of removing a snag requires, on an average, about forty-five minutes, or sixteen snags per day, with a machine that this applicant has recently been experimenting with on the Mississippi river. A greater number, however, may be removed in a day. For a further illustration of this invention, reference may be had to the annexed drawings, (figures 2, 3, 4, 5, 6, and 7.) Figure 1 is a top view; figure 2 is a side view; figure 3 is an end view; figure 4 is a plan of the lower tier of beams, B showing the diagonal braces; *t*, figure 6, is a cross section of the snag beam; figure 5, section showing the manner of drawing up a snag or tree; figure 7, cross section of the framing, (E,) or cradle, with the rollers, (F,) on which the snag or tree is laid after being hauled up.

The boat, being put in motion by the full power of the engine, (say of 120 horse power or more,) is directed in such a manner as to receive the end of the snag on top of the snag beam, (D, figure 2,) when by the great momentum of the whole moving mass, together with the continued action of the engine, the snag is either broken off, (at *a* or *b*, figure 2,) or is loosened from its bed, and thrown in the position (*c*, figure 2) represented by dotted lines, in which case it becomes necessary to raise it on deck; to accomplish which, it is *brought under* the snag beam, and between the two boats, (in the space *m, n, o, p*, fig. 1,) when the chain (N) from the windlass (G, figure 1) is passed around it. The windlass, as before stated, is worked by the fall or rope (*j*) passing through a leading block to a barrel (L) of sixteen inches diameter, fixed on the coupling shaft (M) of the engine, as before stated. When the log or tree is raised so as to meet the shaft of the windlass, it is secured for a moment to a bolster by a chain on deck, when the windlass is overhauled by the downhaul, (V,) which is also worked by a barrel (U) on the main shaft. At the same time the chain as it slacks is hauled out in the position represented in figure 5 by a line (S) attached to a ring (*o*) passing forward to a leading block, (*p*,) and then back to a barrel (U, figure 1) on the main shaft of the engine. As the log or snag rises and becomes counterpoised, it falls back on the rollers (F 1) between the strong timber frames (E) on each side of the rollers, which thus forms a cradle, and secures other parts of the boats from injury. When in this position, the root is cut off, and the trunk cut up and launched into the river by means of a tackle purchase; the root falls through the space (*m, n, o, p*,) and the trunk is launched over the inclined plane (*z*) at the stern. The falls of both these purchases are led to the main shaft of the engine.

The power of this simple piece of mechanism is such as to raise the largest and most firmly planted snag in the river. A snag of 1,600 cubic feet of timber, (after separating the root,) weighing not less than sixty tons, has been raised by the experimenting machine referred to. The machine, however, is capable of raising a weight of more than two hundred tons, and the part that is the most liable to give way is the chain. The machine has raised a tree 160 feet in length, and $3\frac{1}{2}$ feet in diameter; and several that were planted twenty feet in the bed of the river have been raised.

The invention claimed, and desired to be secured by letters patent, consists in the manner in which I have combined and connected the mechani-

cal power of the windlass and the pulley, so as to co-operate with the momentum given to a twin steamboat, and with the continuous action of the paddle wheels, so as to break off, uproot, and raise snags and sawyers, as above set forth. I however particularly claim as new the application of the forward or snag beam, (D,) for the purpose of raising or breaking the snag or sawyer, preparatory to its being lifted on board the boat by the apparatus constructed for that purpose.

I also claim the manner of connecting together the two boats by means of the upper and lower tier of beams, diagonal braces, bulkhead, and forward beam, (D.)

HENRY M. SHREVE.

WM. P. ELLIOT, }
JOHN F. HUNT, } Witnesses.